

What Is Claimed Is:

1. A method for determining a displacement state of a clutch actuator for a vehicle, the clutch actuator being driven by an electric motor, wherein the armature resistance (R_A) of the electric motor is determined in a stationary state of the electric motor, at the determined armature resistance (R_A) and applied motor voltage (U) as well as measured motor current (I), a current (I_{Ind}) induced in the electric motor and/or an induced voltage (U_{Ind}) are calculated, and from the induced current (I_{Ind}) and/or induced voltage (U_{Ind}), which are proportional to the motor speed (n), the displacement state of the clutch actuator is determined.

2. The method as described in Claim 1, wherein the armature resistance (R_A) is determined by the following equation:

$$I = U / R_A$$

wherein

I = measured motor current;

U = applied motor voltage;

R_A = armature resistance.

3. The method as described in Claim 1, wherein the motor speed (n), which is a function of the induced current (I_{Ind}) is determined by following equation:

$$n \propto I_{Ind} = U_{IND} / R_A = U / R_A - I$$

wherein

n = motor speed;

I_{Ind} = induced current;

U_{Ind} = induced voltage;

R_A = armature resistance;

I = motor current on the electric motor;

U = motor voltage on the electric motor.

4. The method as described in Claim 3, wherein the induced voltage (U_{Ind}) is calculated as a function of the motor speed (n) by the following equation:
- $$U_{\text{Ind}} = k_e \cdot n$$
- 5 wherein
- n = motor speed;
- U_{Ind} = induced voltage;
- k_e = proportionality factor.
- 10 5. The method as described in Claim 4, wherein for a clutch actuator having incremental travel measurement, a recalibration is carried out by determining the armature resistance (R_A) at pre-determined time intervals.
6. The method as described in Claim 5, wherein when there is a failure of the
- 15 incremental position encoder, the induced current (I_{Ind}) is used to carry out an emergency operation strategy.
7. The method as described in Claim 1, wherein a change of the motor speed n of the electric motor is detected with the respect to the motor current (I) in order to determine
- 20 the position of the clutch actuator at an abutment and/or a detent.
8. The method as described in Claim 1, wherein the motor temperature is determined at a known armature resistance (R_A).
- 25 9. The method as described in Claim 1, wherein the motor voltage (U) is selected at a determined armature resistance (R_A) in such a manner that a specific motor current (I) and a specific torque is produced at the motor.
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